WS-8015U
Wireless 433 MHz
Weather Station with Sun/Moon Time

Instruction Manual
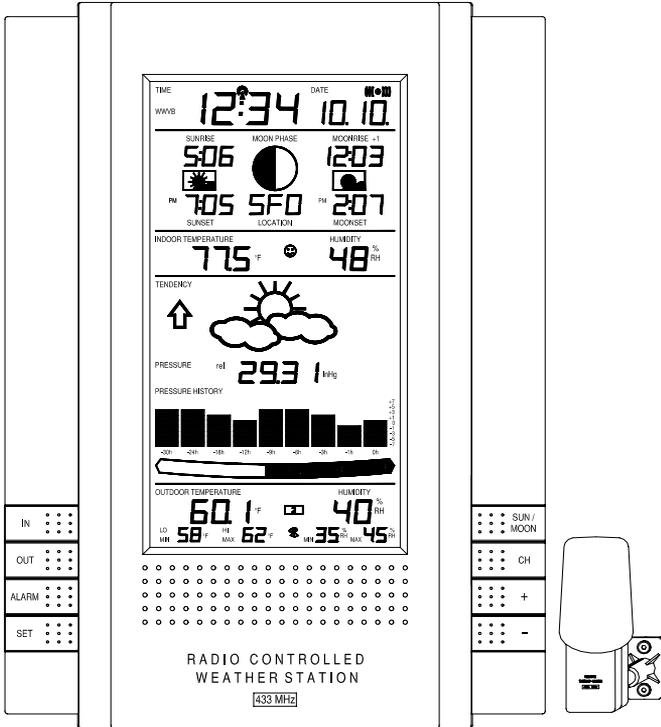
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INVENTORY OF CONTENTS

1. WS-8015U—indoor weather station
2. TX4U—remote thermo/hygro (temperature/humidity) sensor
3. Instruction manual and warranty card

ADDITIONAL EQUIPMENT (not included)

1. Five fresh AA 1.5V alkaline batteries.
2. One wall-mounting screw (optional)
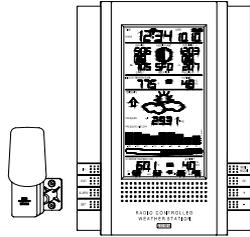
ABOUT WWVB (radio-controlled time)

The NIST (National Institute of Standards and Technology—Time and Frequency Division) radio station, WWVB, is located in Ft. Collins, Colorado and transmits the exact time signal continuously throughout the United States at 60 kHz. The signal can be received up to 2,000 miles away through the internal antenna in the indoor weather station. However, due to the nature of the Earth's Ionosphere, reception is very limited during daylight hours. The indoor weather station will search for a signal every night when reception is best. The WWVB radio station derives its signal from the NIST Atomic clock in Boulder, Colorado. A team of atomic physicists continually measure every second of every day to an accuracy of ten billionths of a second a day. These physicists have created an international standard, measuring a second as 9,192,631,770 vibrations of a Cesium 133 atom in a vacuum. For more information about WWVB please see the NIST website at http://www.boulder.nist.gov/timefreq/stations/wwvb.htm

QUICK SET-UP GUIDE

Hint: Use good quality Alkaline Batteries and avoid rechargeable batteries.

1. Have the indoor weather station and remote thermo/hygro sensor 3 to 5 apart.
2. Batteries should be out of both units for 10 minutes.
3. Place the batteries into the **remote thermo/hygro sensor** first then into the indoor weather station.
   (All remote thermo/hygro sensors must be started before the indoor weather station)
4. DO NOT PRESS ANY BUTTONS FOR 10 MINUTES.

In this time the indoor weather station and remote thermo/hygro sensor will start to talk to each other and the indoor weather station will show both the indoor temperature and humidity and the outdoor temperature and humidity. If the indoor weather station does not display all values after the 10 minutes please retry the set up as stated above. After all values are displayed for 10 minutes you can place your remote thermo/hygro sensor outdoors and set your time.

The remote thermo/hygro sensor should be placed in a dry, shaded area. The remote thermo/hygro sensor has a range of 80 feet. Any walls that the signal will have to pass through will reduce distance. An outdoor wall or window will have 20 to 30 feet of resistance and an interior wall will have 10 to 20 feet of resistance. Your distance plus resistance should not exceed 80 ft. in a straight line.

NOTE: Fog and mist will not harm your remote thermo/hygro sensor but direct rain must be avoided.

To complete the set up of your indoor weather station after the 10 minutes have passed please follow the steps in the Detailed Set Up Guide.

Note: The remote thermo/hygro sensor transmits a signal every 3 minutes; after the batteries have been installed, the indoor weather station will search for the signal for a duration of 5 minutes. If there is no temperature reading in the OUTDOOR LCD after 5 minutes, make sure the units are within range of each other, or repeat the battery installation procedure.

DETAILED SET-UP GUIDE

I.   Battery Installation

Batteries will fit tightly. To avoid start-up problems, make sure that the batteries do not spring free. Also be sure to insert alkaline batteries into the remote thermo/hygro sensor first, then the indoor weather station. Initial set up should be done with the remote thermo/hygro sensor and indoor weather station in the same room. The units should be permanently mounted only after the signal reception has been verified.
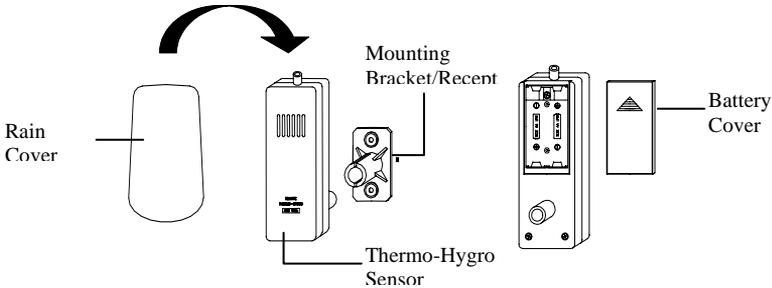
A. Remote Temperature and Humidity Sensor, TX4U
1. Pull the cylindrical rain cover off the sensor.
2. Remove the battery cover (located on the backside of the sensor, above the mounting post and bracket). Press the arrow and slide the battery cover off.
3. Observing the correct polarity install 2 Alkaline AA batteries.
4. Replace battery cover, and place rain cover snugly onto the sensor.

B. Weather Center
1. Remove the battery cover (the cover has white writing on it).
2. Observe the correct polarity, and install three Alkaline AA batteries.
3. Do not press any buttons for at least ten minutes. If a button is pressed before the Weather Center has received information from the TX4U sensor, no data will be received from that sensor until reset.
4. Replace the battery cover.
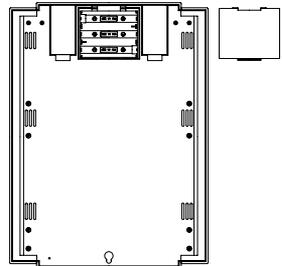
II. Start Up Sequence

A. Initial Start
1. Immediately after the batteries have been installed, the indoor weather station will sound a "beep", and the LCD will completely light up for a brief moment.
2. All information will then appear in normal mode, with "12:00" as the default time and "1.1" as the default date (2001 as the year).
3. "DCA" is the default city (Washington, DC, USA), with the sunrise, sunset, moonrise and moonset times displayed for that city at that date.
4. The indoor temperature and humidity, and barometric air pressure (as 29.91 inHg relative RH) will also be displayed.
5. There is a "satellite" icon that appears near the bottom of the LCD, to the right of the "max" remote temperature—this icon informs the user that the indoor weather station is looking for signals from the remote thermo/hygro sensor. Within five minutes the remote temperature and humidity should be displayed—if not, remove batteries from all units and repeat battery installation, the remote temperature sensor first, then the indoor weather station.

B. WWVB Reception
1. Once the batteries are installed in the Weather Center, it will automatically search for the WWVB signal. If it receives a good signal (which is unlikely during daylight hours in most locations), the WWVB reception indicator (looks like a tower icon) will flash. The indoor weather station requires five full minutes of good reception to successfully capture the signal and set to the correct hour, minute, second, month, day and year. If the signal reception is not successful within ten minutes, the signal search will be cancelled and will automatically resume every two hours until the signal is successfully captured.
2. The signal is sent from Ft. Collins, Colorado only and is similar to an AM radio signal. Atmospheric interferences such as storms, sunspots, and even sunlight will cause the signal to not travel as far.
3. To maximize reception, place the indoor weather station in a window facing Colorado, at least six feet from any electrical source (computers, televisions, refrigerators, etc.). Do not move the indoor weather station while it is searching for the signal.
4. The time and date can be manually set. Once the signal is captured, it will override any time and date set to the time zone selected.

5. Once the time and date are set, the indoor weather station will conduct a search every night at midnight and correct to the accurate time and date (Daylight Saving Time is automatic). If the signal has been received in the past 24 hours, the reception indicator will be displayed.

III. Explanation of LCD Information
   A. The below picture highlights the LCD features
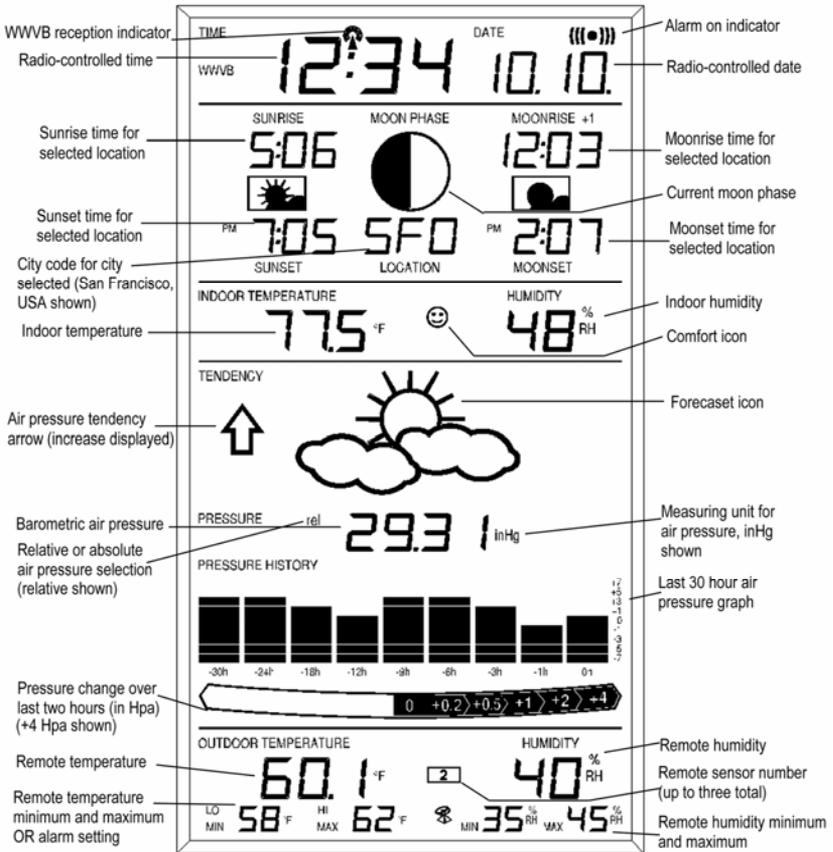
   B. There are many different modes the indoor weather station can be set to. The LCD shown is the normal operating mode, and your actual data shown will be different based on your local settings and conditions.

IV. Function Key Layout

A. The below picture shows the eight function keys used in programming and operation of your indoor weather station
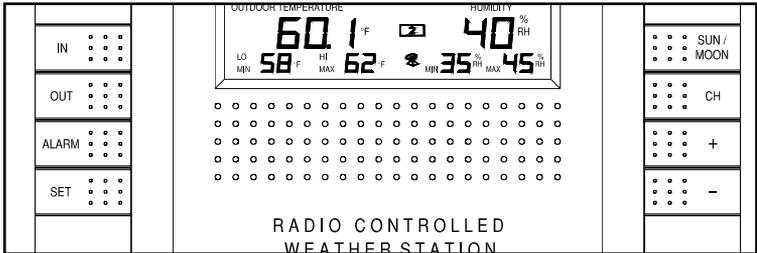
V. Program Mode

The program mode is laid out in a manner that allows you to program each function separately, or you can follow the instructions entirely to program the indoor weather center. Complete programming is usually done for the initial set-up, and will require you to skip step 1 and 2 of each programming section. The programming mode can be exited at any time by either pressing the "CH" button, or waiting for the 16-second time-out to take effect.

A. Overview of programming mode sequence

<u>*Note:*</u> *If the country setting is other than USA step 8 is city, step 9 is time zone, etc.*

1. Hour	2. Minute	3. 12/24 hour	4. Year
5. Month	6. Date	7. Country	8. State
9. City	10. Time Zone	11. DST on/off	12. °F/°C
13. inHg/hPa	14. Relative pressure setting	15. Forecast sensitivity	16. Storm warning setting
17. Storm alarm on/off	18. LCD contrast	19. LI on/off	

B. Time, 12/24 Hour Mode and Date Setting

The WWVB signal will override any manual set time and date information. The time will be based on the time zone selected.

1. Press and hold the *"SET"* button for 1 second.
2. The hour is now flashing.
3. Press and release the *"+"* or *"–"* button to select the current hour.

Note: *In 12h mode "PM" will appear to the left of the time during PM hours. If the time is not within the PM hours nothing will be displayed. Be sure to set the time to the correct AM/PM time to ensure automatic reception.*

4. Press the "*SET*" button to advance to the minute
5. The minute is now flashing.
6. Press and release the *"+"* or *"–"* button to select the current minute.
7. Press and release the "*SET*" button to advance to the 12/24-hour setting.
8. "12" is now flashing.
9. Press and release the *"+"* or *"–"* button to select either 12 (am/pm) or 24 hour (military) time format.
10. Press and release the *"SET"* button to advance to the year setting.
11. The year is now flashing.
12. Press and release the *"+"* or *"–"* button to select the current year.
13. Press and release the "*SET*" button to advance to the month setting.
14. The month is now flashing.
15. Press and release the *"+"* or *"–"* button to select the current month.
16. Press and release the "*SET*" button to advance to the date setting.
17. The date is now flashing.
18. Press and release the *"+"* or *"–"* button to select the current date.
19. Press and release the "*SET*" button to advance to the location setting (skip steps 1 and 2 in section B if continuing).

C. City Location Setting

The list of the cities available is listed after this section.

1. Press and hold the "*SET"* button for 1 second.
2. Press and release the "*SET"* button 6 times.
3. The country location will flash (USA default/factory setting).
4. Press and release the *"+"*or *"–"* button to select the country (USA=United States, CAN=Canada, MEX=Mexico).
5. Press and release the "*SET"* button to advance to the state setting (USA only) or the city location (Canada or Mexico).

Skip to step nine if Mexico or Canada is selected

6. The state is now flashing.
7. Press and release the *"+"*or *"–"* button to select the state.
8. Press and release the "*SET"* button to advance to the city setting.
9. The city is now flashing.
10. Press and release the *"+"*or *"–"* button to select the city closest to your location (abbreviated by airport code, if applicable).
11. Press and release the "*SET"* button to advance to the time zone setting (skip steps 1 and 2 in section D if continuing).

Section C lists the available city codes. Section D continues with the setup programming.

D. City Location Listing

The following list of city locations is entered in the database. Due the limited memory, 245 cities are listed. Every attempt has been made to provide a location close to all parts of North America. The choices were based first on state capitals, then nearby locations based on population and difference of latitude and longitude. There are cases where your city may be closer to a city in a nearby state rather than your state. We are unable to change the database, but are open to suggestions for future locations. If you feel there is a city that should be listed, please write to us (either mail or e-mail).

United States Cities, Listed by State

Code	State/City	Code	State/City	Code	State/City
AK	**Alaska**	**CA**	**California (cont.)**	**GA**	**Georgia**
ANC	Anchorage	SAC	Sacramento	ABY	Albany
FAI	Fairbanks	SAN	San Diego	AGS	Augusta
JNU	Juneau	SBD	San Bernardino	ATL	Atlanta
OME	Nome	SFO	San Francisco	CSG	Columbus
AL	**Alabama**	**CO**	**Colorado**	MAC	Macon
BHM	Birmingham	DEN	Denver	SAV	Savanna
GAD	Gadsden	DRO	Durango	**HI**	**Hawaii**
MGM	Montgomery	FNL	Ft. Collins	HNL	Honolulu
MOB	Mobile	GJT	Grand Junction	ITO	Hilo
AR	**Arkansas**	ITR	Burlington	OGC	Kahului
FSM	Fort Smith	PUB	Pueblo	WAI	Waimea
LIT	Little Rock	**CT**	**Connecticut**	**IA**	**Iowa**
TXK	Texarkana	HFD	Hartford	ALO	Waterloo
AZ	**Arizona**	**DC**	**District of Columbia**	DSM	Des Moines
FLG	Flagstaff	DCA	Washington	DVN	Davenport
PHX	Phoenix	**DE**	**Delaware**	SUX	Sioux City
TUS	Tucson	0N5	Dover	**ID**	**Idaho**
YUM	Yuma	**FL**	**Florida**	BOI	Boise
CA	**California**	EYW	Key West	GIB	Gibbonsville
BFL	Bakersfield	JAX	Jacksonville	PIH	Pocatello
BLH	Blythe	MIA	Miami	SZT	Sand Point
EKA	Eureka	ORL	Orlando	**IL**	**Illinois**
FAT	Fresno	PNS	Pensacola	CMI	Champaign
FTB	Ft. Bragg	TLH	Tallahassee	ORD	Chicago
LAX	Los Angeles	TPA	Tampa	SPI	Springfield
ROD	Redding				

IN	Indiana	MN	Minnesota	ND	North Dakota, cont.
EVV	Evansville	AEL	Albert Lea	GFK	Grand Forks
HUF	Terre Haute	BJI	Bemidji	**NE**	**Nebraska**
IND	Indianapolis	DLH	Duluth	GRI	Grand Island
SBN	South Bend	GPO	Grand Portage	LNK	Lincoln
KS	**Kansas**	INL	International Falls	OMA	Omaha
DDC	Dodge City	STP	St. Paul	SNY	Sidney
K32	Wichita	**MO**	**Missouri**	VTN	Valentine
KCK	Kansas City	JEF	Jefferson City	**NH**	**New Hampshire**
OH1	Wakeeney	MKC	Kansas City	CON	Concord
TOP	Topeka	MPH	Memphis	**NJ**	**New Jersey**
KY	**Kentucky**	POF	Poplar Bluff	EWR	Newark
FFT	Frankfort	SGF	Springfield	TTN	Trenton
LEX	Lexington	STL	St. Louis	**NM**	**New Mexico**
LOU	Louisville	**MS**	**Mississippi**	ABQ	Albuquerque
LA	**Louisiana**	GWO	Greenwood	MAG	Magdalene
BTR	Baton Rouge	HUV	Huntsville	ROW	Roswell
CWF	Lake Charles	JAN	Jackson	RTN	Raton
IER	Natchitoches	TUP	Tupelo	SAF	Santa Fe
NEW	New Orleans	**MT**	**Montana**	**NV**	**Nevada**
SHV	Shreveport	BIL	Billings	AIN	Austin
MA	**Massachusetts**	FTP	Ft. Peck	CXP	Carson City
BOS	Boston	GFT	Great Falls	ELY	Ely
MD	**Maryland**	HLN	Helena	LAS	Las Vegas
BWI	Baltimore	SDY	Sidney	LWL	Wells
ME	**Maine**	WTF	Whitefish	RNO	Reno
AUG	Augusta	**NC**	**North Carolina**	**NY**	**New York**
BGR	Bangor	AVL	Asheville	ALB	Albany
CAR	Caribou	CLT	Charlotte	BUF	Buffalo
PWM	Portland	FAY	Fayetteville	JFK	New York City
MI	**Michigan**	ILM	Wilmington	LKP	Lake Placid
AZO	Kalamazoo	INT	Winston-Salem	SYR	Syracuse
DET	Detroit	MCZ	Williamston	**OH**	**Ohio**
FNT	Flint	RDU	Raleigh	CLE	Cleveland
LAN	Lansing	**ND**	**North Dakota**	CMH	Columbus
PZQ	Rogers City	BIS	Bismarck	ISZ	Cincinnati
SAW	Marquette	BWB	Bowbells	TOL	Toledo
TVC	Traverse City	FAR	Fargo	YNG	Youngstown

OK	**Oklahoma**	**TX**	**Texas (cont.)**	**WV**	**West Virginia**
17K	Boise City	DFW	Dallas/Ft. Worth	CRW	Charleston
LAW	Lawton	ELP	El Paso	HLG	Wheeling
OKC	Oklahoma City	HOU	Houston	**WY**	**Wyoming**
TUL	Tulsa	LRD	Laredo	BYG	Buffalo
OR	**Oregon**	ODO	Odessa	CPR	Casper
BNO	Burns	SAT	San Antonio	CYS	Cheyenne
EUG	Eugene	**UT**	**Utah**	LAA	Little America
MFR	Medford	SAL	Saline	WYE	West Yellowstone
PDX	Portland	SGU	St. George		
SLE	Salem	SLC	Salt Lake City		
PA	**Pennsylvania**	TSN	Thompson		
CXY	Harrisburg	**VA**	**Virginia**		
PHL	Philadelphia	DON	Vienna		
PIT	Pittsburgh	LYH	Lynchburg		
SCR	Scranton	ORF	Norfolk		
PR	**Puerto Rico**	RIC	Richmond		
SJU	San Juan	ROA	Roanoke		
RI	**Rhode Island**	**VT**	**Vermont**		
PVD	Providence	BTV	Burlington		
SC	**South Carolina**	MPR	Montpelier		
CHS	Charleston	**WA**	**Washington**		
CUB	Columbia	ABE	Aberdeen		
GMU	Greenville	ALW	Walla Walla		
SD	**South Dakota**	KTF	Kettle Falls		
FSD	Sioux Falls	MVN	Mt. Vernon		
PIR	Pierre	OLM	Olympia		
RAP	Rapid City	SEA	Seattle		
TN	**Tennessee**	SFF	Spokane		
BNA	Nashville	TON	Tonasket		
CHA	Chattanooga	YKM	Yakima		
DKX	Knoxville	**WI**	**Wisconsin**		
MEM	Memphis	AUW	Wausau		
TX	**Texas**	GRB	Green Bay		
ABI	Abilene	LSE	La Crosse		
AMA	Amarillo	MSN	Madison		
AUS	Austin	MWC	Milwaukee		
BRO	Brownsville	SSQ	Spooner		

Canada City Listing

Code	City	Code	City	Code	City
EDM	Edmonton	YEL	Yellowknife	CHT	Charlotte Town
ALB	Calgary	OTT	Ottawa	MON	Montreal
VAN	Vancouver	SUD	Sudbury	QUE	Quebec
WIN	Winnipeg	THU	Thunder Bay	REG	Regina
FRE	Fredericton	TOR	Toronto	WHI	Whitehorse
HAL	Halifax				

Mexico City Listings

Code	City	Code	City	Code	City
CHH	Chihuahua	MEX	Mexico City	HER	Hermosillo
DUR	Durango	GUA	Guadalupe		

E. Time Zone and Daylight Saving Time Settings

1. Press and hold the *"SET"* button for 1 second.
2. Press and release the *"SET"* button 9 times.
3. The time zone will now flash based on the city selected.
4. Press and release the *"+"* or *"–"* button to adjust to the correct time zone.
5. Press and release the *"SET"* button to advance to the Daylight Saving Time setting.
6. "dst ON" will now flash.
7. Press and release the *"+"* or *"–"* button to select DST 1 (recognizes Daylight Saving Time change) or DST 0 (does not change with Daylight Saving Time).

Note: Some locations (Arizona and parts of Indiana) do not follow Daylight Saving Time.

8. Press and release the *"SET"* button to advance to the weather measurement units settings (skip steps 1 and 2 in section E if continuing).

F.   Weather measurement units (°F/°C, inHg/hPa)

1. Press and hold the *"SET"* button for 1 second.
2. Press and release the *"SET"* button 11 times.
3. The selected temperature units will now flash (°F default/factory setting).
4. Press and release the *"+"* or *"−"* button to select °F (Fahrenheit) or °C (Celsius).
5. Press and release the *"SET"* button to advance to the barometric air pressure units setting.
6. The selected air pressure units will now flash (inHg default/factory setting).
7. Press and release the *"+"* or *"−"* button to select inHg (inches of Mercury) or hPa (hectopascal or millibars).
8. Press and release the *"SET"* button to advance to the barometric air pressure calibration setting.
9. The air pressure reading will now flash (29.91 inHg, 1012.8 hPa as default).
10. Press and release the *"+"* or *"−"* button to adjust to the correct relative air pressure based on local reports.
11. Press and release the *"SET"* button to advance to the forecast sensitivity setting.

__Note:__ Barometric air pressure is usually reported as "relative air pressure". This reading is based on the combination of absolute air pressure and altitude. In general, an increase in altitude will result in a decrease in air pressure. Relative air pressure will make readings in nearby locations relative to each other to allow for proper forecasting. The absolute air pressure reading in the Weather Center cannot be calibrated, only the relative air pressure.

12. The selected forecast sensitivity setting will now flash (0.09 inHg default).
13. Press and release the *"+"* or *"−"* button to select 0.06, 0.09, or 0.12 inHg (if hPa is selected, the choices will be 2, 3, or 4). A lower setting will result in a quicker change in the forecast icon. In other words, if the setting is 0.06 inHg, the forecast icon will change if the air pressure changes by at least 0.06 inHg within a six-hour period. This is useful, as certain areas will have a change of air pressure but no change in weather.
14. Press and release the *"SET"* button to advance to the storm warning setting.
15. The selected storm warning level will now flash (0.15 inHg, 5 hPa default).

16. Press and release the *"+"* or *"–"* button to select the storm warning setting. This can be set to 0.09, 0.12, 0.15, 0.18, 0.21, 0.24, or 0.27 inHg (from 3 to 9 hPa). This setting will determine how much of a drop in air pressure over six hours will sound the storm warning alarm.
17. Press and release the *"SET"* button to advance to the storm warning alarm on/off setting.
18. The storm warning on or off setting will now flash (AOFF default/factory setting).
19. Press and release the *"+"* or *"–"* button to select whether or not the storm warning alarm is activated.
20. Press and release the *"SET"* button to advance to the LCD setting (skip steps 1 and 2 in section F if continuing).

G. LCD Contrast

1. Press and hold the *"SET"* button for 1 second.
2. Press and release the *"SET"* button 17 times.
3. The LCD contrast setting will now flash (4 is the default/factory setting).
4. Press and release the *"+"* or *"–"* button to select the contrast level desired (from 1 to 8).
5. Press and release the *"SET"* button to advance to the LI setting.
6. The LI setting will now flash (ON is the default/factory setting).
7. Press and release the **"+"** or **"–"** button to select ON or OFF.
8. Press and release the *"SET"* button to exit the programming mode.

__Note:__ The LI setting does not affect the function of the indoor weather station and is present only for future use.

FEATURES AND OPERATIONS

A. Sunrise/set and Moonrise/set Calculation

The indoor weather station will calculate the sunrise/set moonrise/set each day based on the location entered through the programming mode. To view another location and/or date without affecting the programmed city location and date, follow section A.2 in Features and Operations.

1. **Daylight Hours and Minutes Calculation**

    Press and release the *"SUN/MOON"* button. In place of the sunrise/sunset time will be the number of daylight hours and minutes. Press the *"SUN/MOON"* button to view the sunrise/sunset time again.

2. **View Different Location/Time for Sunrise/set and Moonrise/set**

If no buttons are pressed in 30 seconds during this selection the indoor weather station will revert to the normal mode. Alternatively, you may press the "CH" key to revert to the normal mode.

   a. Press and hold the *"SUN/MOON"* key for at least two seconds.
   b. The selected country will now flash.
   c. Press and release the *"+"* or *"–"* key to select the desired country.
   d. Press and release the *"SET"* key to advance to the state selection (or city if Canada or Mexico is selected skip to step h.).
   e. The state is now flashing.
   f. Press and release the *"+"* or *"–"* key to select the state (see listing on pages 11 to 14).
   g. Press and release the *"SET"* key to advance to the city selection.
   h. The city is now flashing.
   i. Press and release the *"+"* or *"–"* key to select the city.
   j. Press and release the *"SET"* key to advance to the date setting.

If the sunrise/set moonrise/set times are desired for the current date, the "SUN/MOON" key may be pressed to calculate. Skip to step t for further explanation.

   k. The year is now flashing (the current year).
   l. Press and release the *"+"* or *"–"* key to select the year desired.

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m. Press and release the *"SET"* key to advance to the month setting.
n. The month is now flashing (the current month).
o. Press and release the *"+"* or *"–"* key to select the month desired.
p. Press and release the *"SET"* key to advance to the date setting.
q. The date is now flashing (the current date).
r. Press and release the *"+"* or *"–"* key to select the date desired.
s. Press and release the *"SUN/MOON"* key to calculate the new city location at the date selected.

You may instead press the "SET" key to select a different location, starting at step b above.

t. Once the *"SUN/MOON"* key is pressed, the sunrise/set and moonrise/set times will flash as dashes while the indoor weather station calculates the times (the moon phase is calculated, also). Once the times are displayed, the indoor weather station will remain in this mode for 30 seconds or until the *"CH"* key is pressed. The year, month, or date will also be flashing. At this time it is possible to start at step b. to select another date or location.
u. Once this mode is exited either through timeout after 30 seconds or by pressing the *"CH"* button, the indoor weather station will revert to the normal mode with the location and date set through the programming mode. The indoor weather station will default to the last city selected when this mode is entered again.

B. Moon Phase

 1. There are 12 moon phases shown on the indoor weather station;
     the black portion signifies the portion of the moon visible in the
     sky. Thus, when the moon icon is all black, it is a full moon. The
     indoor weather station is programmed with all moon phases from
     the year 2000 until 2099.
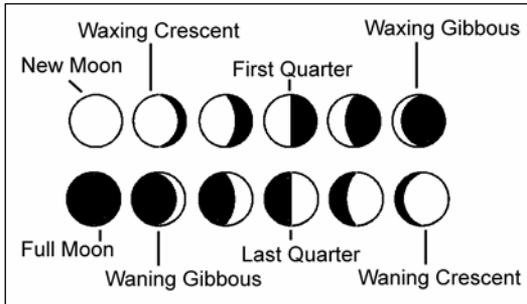
 2. The moon phase for any date may be found by selecting a different
     date through the sun rise/set moon rise/set programming section
     (section A in Features and Operations).

C. Minimum and Maximum Temperature and Humidity

 1. **Indoor Minimum and Maximum Temperature and Humidity**

     The indoor weather station automatically stores the minimum and
     maximum indoor temperature and humidity. The minimum and
     maximum values are updated automatically when a new minimum
     or maximum is recorded, or until manually reset.

     a. From the normal display mode, press and release the *"IN"* key
         once to view the indoor minimum temperature and humidity
         ("MIN" will be displayed near the indoor temperature and
         humidity).
     b. Press and release the *"IN"* key again to view the indoor
         maximum temperature and humidity.
     c. Press and release the *"IN"* key again to return to the normal
         mode (timeout of viewing minimum/maximum values will
         occur if no keys are pressed for fifteen seconds).

     Note: To reset the indoor minimum and maximum temperature
     and humidity, press and hold the *"IN"* key for at least two seconds.

2. **Outdoor Minimum and Maximum Temperature and Humidity**

The indoor weather station automatically stores the minimum and maximum outdoor temperature and humidity. The minimum and maximum values are updated automatically when a new minimum or maximum is recorded, or until manually reset.

a. The outdoor (remote) minimum and maximum temperature values are displayed below the outdoor temperature display.
b. These values are rounded down for minimum and rounded up for maximum.

Note: *The temperature alarm mode shares the same display. When the alarm values are displayed, "ALARM" will be displayed above the remote temperature. To switch back and forth between views, press the "OUT" key.*

c. To reset the outdoor minimum and maximum temperatures press and hold the *"CH"* key for at least one second.

D. **Multiple Remote Temperature Sensors**

The WS-8015U is able to receive signals from 3 different remote sensors. These extra remote sensors can be purchased through the same dealer as this unit. A TX4U will monitor the temperature and humidity, a TX3U will monitor temperature and display the temperature on its LCD and the TX3UP will monitor the temperature via a probe for measuring soil or water temperatures.

Note: When setting up multiple units it is important to insert batteries first into all the remote sensors, and in numeric sequence. Second install batteries into the indoor weather station. Transmission problems will arise if this is not done correctly and if the total time for set-up exceeds 6 minutes

1. **Set Up of Multiple Units**

a. It is necessary to remove the batteries from all units currently in operation.
b. Remove the battery covers to all remote sensors.
c. Place all remote sensors in a numeric sequential order.
d. In sequential order, install batteries following the same battery installation procedures seen in Detailed Set-Up Guide section of this manual.
e. Install batteries into the indoor weather station.

  f. Follow the Detailed Set-Up Guide for programming and operating instructions.

2. **Viewing and Operating with Multiple Remote Sensors**

  a. To view the temperature of a different remote sensor press and release the *"CHANNEL"* button. A shift from one "boxed" number to the next should be observed in the OUTDOOR LCD.
  b. The minimum and maximum temperature of the additional remote sensor will be displayed below the current temperature of the remote sensor in the OUTDOOR LCD.
  c. To reset the minimum and maximum temperature readings press and hold the *"RESET"* button for 5 seconds and the records for all the remote sensor will be reset.

Each remote sensor will have its own minimum and maximum values stored, as well as its own alarm settings for temperature. Resetting the outdoor minimum and maximum values will reset all remote sensors' recordings.

E. **Remote Temperature Alarm**

1. **Activating the alarm**

From the normal mode, press and release the *"OUT"* key to toggle between the temperature alarm and minimum/maximum values. "ALARM" will be displayed above the remote temperature display; this will also activate the temperature alarm.

2. **Setting the temperature alarm**

  a. Press and hold the *"OUT"* key for two seconds.
  b. The low temperature will be flashing (32°F default/factory setting).
  c. Press and release the *"+"* or *"–"* key to adjust the temperature from -22°F to +157°F ("- -" if outside this range). Any value attained below this will sound the alarm.
  d. Press and release the *"SET"* key to advance to the high temperature alarm.
  e. The high temperature setting is now flashing (86°F default/factory setting).
  f. Press and release the *"+"* or *"–"* key to adjust the temperature from -22°F to +157°F ("- -" if outside this range). Any value attained above this value will sound the alarm.

g. Press and release the *"SET"* key to return to the normal display mode (or the display will timeout after fifteen seconds and return to the normal mode automatically).

3. **Canceling the Temperature Alarm While Sounding**
   a. While the alarm is sounding, press any key to mute the alarm. The temperature will flash as long as the value is above the set value.
   b. The alarm will reactivate automatically once the value has fallen below the set value, or if a new value is entered.

F. Comfort Indicator for Indoor Temperature and Humidity

1. The comfort level indicator appears inbetween the indoor tempearture and humidity.
2. The indicator will display a "happy-face" when the temperature is between 68°F and 79°F (20°C and 25.9°C), and the humidity is between 45% and 64%.
3. A "sad-face" will be displayed when the temperature and humidity are outside the mentioned ranges.
4. If the humidity is below 45% the word "DRY" will appear to the right of the "sad-face" icon.
5. If the humidity is above 54% the word "WET" will appear to the right of the "sad-face" icon.

G. Weather Forecast Icon and Pressure Trend Indicators

The weather forecasting feature is estimated to be 75% accurate, and is based solely upon the change of air pressure over time. The WS-8015U averages past air-pressure readings to provide an accurate forecast—creating a necessity to disregard all weather forecasting for 12-24 hours after the unit has been set-up, reset, or moved from one altitude to another (i.e. from one floor of a building to another floor). In areas where the weather is not affected by the change of air pressure, this feature will be less accurate.

1. **Weather Icons**
   a. There are 3 possible weather icons that will be displayed at various times in the center of the indoor weather station.

   i   *Sunny—*indicates that the weather is expected to improve (not that the weather will be sunny).
   ii *Sun with Clouds—*indicates that the weather is expected to be fair (not that the weather will be sunny with clouds).
   iii *Clouds with Rain—*indicates that the weather is expected to get worse (not that the weather will be rainy).

   b. The weather icons change when the unit detects a change in air pressure.
   c. The icons change in order, from "sunny" to "sun with clouds" to "clouds with rain" or the reverse.
   d. It will not change from "sunny" directly to "clouds with rain", although it is possible for the change to occur quickly.
   e. If the symbols do not change, the weather has not changed (or the change has been slow and gradual).
   f. The sensitivity of the change in foreacst icon is set by the user in section F of the Detailed Set Up Guide.

H. Weather Tendency Arrows

1. Along with the forecast icon there is a pressure tendency arrow.

2. There is one that points up (on the left side of the LCD) and one that points down (on the right side of the LCD).
3. These arrows reflect current changes in the air pressure.
4. An arrow pointing up indicates that the air pressure is increasing and the weather is expected to improve or remain good.
5. An arrow pointing down indicates that the air pressure is decreasing and the weather is expected to become worse or remain poor.
6. No arrow means the pressure is stable.
7. A storm can be expected if there is a drop of 4 hPa or more in less than 6 hours. The *clouds with rain* icon will be displayed and the tendency arrow that points down will be flashing—indicating the storm warning feature has been activated. The flashing will stop
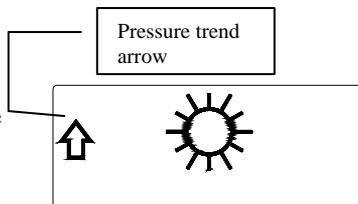
when the air pressure stabilizes or begins to rise.

I. Storm Warning Alarm

1. An alarm can be set to warn of a drop in air pressure.
2. Please follow the programming instructions in section F of the Detailed Set Up Guide to activate this alarm
3. When the air pressure drops by the level set, an alarm will sound (if the alarm is activted).
4. To cancel the alarm while sounding press any key.

J. Air Pressure Tendency for Past Two Hours

The bar below the air pressure history chart displays the air pressure change over the past two hours (values based on hPa change, 1 hPa equals 0.03 inHg).

K. Barometric Air Pressure Reading

1. The actual barometric air pressure is displayed directly under the weather forecast icon
2. The relative air pressure is calibrated by the user through the programming mode.
3. Please Follow the programming instructions in section F of the Detailed Set Up Guide to set this feature.
4. To toggle between absolute and relative air pressure, press the "– " key.

L. Air Pressure History Bar Chart

1. The bar graph shows in hPa (Hekto Pascal) the recorded air pressure over the past 30-hours.
2. The horizontal axis shows the hours at increments of –30 hours, -24 hours, -18 hours, -12 hours, -6 hours, -3 hours, -1 hours, and 0 hours (current).
3. The vertical axis is set by hPa: the "0" on this axis represents the current hPa, and + or – 1,3,5, or 7 shows (in hPa) how high or low the past air pressure was as compared to the current one.
4. The "0" on the vertical axis indicates the current air pressure value.
5. The "0h" on the horizontal axis indicates the current hour, thus the current air pressure also.
6. Each bar on the bar graph represents a value of 0.03 hPa, and each bar also has a corresponding value on the verticle axis.

7. Air pressure trends can be determined by simply glancing at the bar graph.
   a. If the bars are rising (higher on the right than the left) then the air pressure has a rising trend, and the weather should improve.
   b. If the bars are dropping (lower on the right than the left) then the air pressure has a falling trend, and the weather should worsen.
8. Multiply the two values to find past air pressure (note the + or – sign of values on the verticle axis); i.e. 0.03 hPa x 3 = 0.09 hPa, now add this value to the air pressure (in LCD 4) to evaluate what past air pressures have been.
9. The bar chart will constantly scroll to avoid burnout of the LCD.

Note: This feature cannot be turned off.

VII. MOUNTING

Note: Before permanently mounting, ensure that the indoor weather station is able to receive signals from the sensors and WWVB signal at the desired location. To achieve a true temperature reading, avoid mounting the remote thermo/hygro sensor (or any sensor) where direct sunlight can reach the remote sensor. We recommend that you mount the remote sensor on a North-facing wall or under an eve. The sending range of the remote thermo/hygro sensor is 80-ft (25m) however obstacles such as walls, concrete, and large metal objects can reduce the range. Place all units in their desired location, and wait approximately 15 minutes before permanently mounting to ensure that there is proper reception. If the indoor weather station loses the signal from the remote sensor, it will display the last temperature reading for 15 minutes. After 15 minutes of not receiving any signals, the remote temperature will display "- -.-".

A.   Mounting the Remote Thermo/hygro Sensor

The remote thermo/hygro sensor can be mounted with the use of screws or by using the adhesive tape.

1.   Mounting with screws

  a.   Remove the mounting bracket/receptor from the packaging.
  b.   Place the mounting bracket over the desired mounting surface.
  c.   Through the 2 screw holes of the bracket, mark the mounting surface with a pencil.
  d.   Where marked, start the screw holes using the provided screws.
  e.   Remove screws from the mounting surface.
  f.   Align the mounting bracket with the started screw holes.
  g.   Screw mounting bracket onto the mounting surface. The screws should be flush with the bracket.
  h.   Fit the mounting post (on the back of the sensor) into the receptor of the mounting bracket.
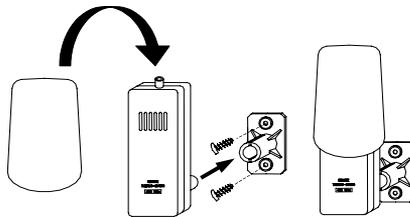
2. Mounting with Adhesive Tape

  a. With a nonabrasive solution, clean and dry the back of the mounting bracket and the mounting surface to ensure a secure hold. The mounting surface should be smooth and flat.
  b. Remove the protective strip from one side of the tape.
  c. Press firmly onto the designated area on the back of the mounting bracket.
  d. Remove the protective strip from the other side of the tape, and situate the mounting bracket.
  e. Firmly press the mounting bracket onto the mounting surface.
  f. Fit the mounting post into the receptor of the mounting bracket.

B. Mounting the WS-8015U Weather Center

The indoor weather station can be mounted in two ways; free standing or hanging on a wall.

To have the indoor weather station free standing, simply unfold the stands on the back and set on a stable flat surface.
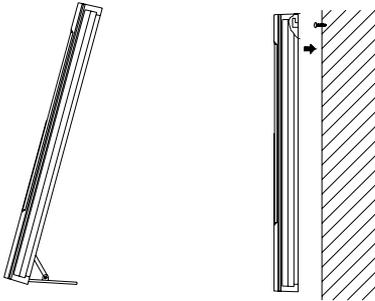
To wall mount the indoor weather station;

1.   Ensure that the integrated stands are folded in.
2. Fix a screw (not included) into the desired wall, leaving approximately 3/16 of an inch (5mm) extended from the wall.
3. Place the indoor weather station onto the screw using the hanging hole on the backside. Gently pull the indoor weather station down to lock the screw into place.

Maintenance and Care Instructions

    A. Extreme temperatures, vibration, and shock should be avoided to prevent damage to the units.

    B. Clean displays and units with a soft, damp cloth. Do not use solvents or scouring agents; they may mark the displays and casings.

    C. Do not submerge in water.

    D. Immediately remove all low powered batteries to avoid leakage and damage.

    E. Opening the casings invalidates the warranty. Do not try to repair the unit. Contact La Crosse Technology for repairs.

TROUBLESHOOTING

Problem:	The LCD is faint.
Solution:	1) Set the LCD contrast to a higher level. 2) Replace batteries.
Problem:	No outdoor temperature/humidity is displayed.
Solution:	1) Remove all batteries, reinsert into the remote thermo/hygro sensor first, then into the indoor weather station. 2) Place remote thermo/hygro sensor closer to the indoor weather station. 3) Be sure all batteries are fresh. 4) No other interfering sources are being used (such as computer monitors, TV sets, headphones, or speakers) in the vicinity. The signal travels in a straight line, an electrical source near that "line" may cause interference.
Problem:	Temperature, humidity, or air pressure is incorrect.
Solution:	1) Check/Replace batteries. 2) If multiple remote sensors are in use, check location with corresponding "boxed numbers." 3) Move away from sources of heat/cold. 4) Adjust relative air pressure to a value from a reliable source (TV radio, etc.). 5) The indoor weather station and remote sensors are calibrated at the factory. If there is a consistent problem, please call La Crosse Technology.
Problem:	"- -" in humidity display.
Solution:	1) Humidity is below 20% or above 95%. 2) TX3U or TX3UP is used for remote temperature.
Problem:	WWVB time and date will not set or update
Solution:	1) Wait until overnight for signal to be received 2) Move indoor weather station away from sources of electricity 3) Place indoor weather station in window facing Colorado 4) The first reception is most difficult, as the indoor weather station needs five continual minutes of clear signal reception. After the initial time/date set, the indoor weather station only requires one full minute of clear reception each night.

SPECIFICATIONS

Radio-controlled Time Signal	WWVB, 60 kHz from Ft. Collins, CO
Indoor weather station recommended operating temperature	32°F to 122°F (0°C to 50°C)
LCD contrast	8 levels (1-8)
Sunrise/set, Moonrise/set, and moon phase dates available	January 1, 2000 through December 31, 2099
Temperature measuring range	
Indoor	14°F to 140°F with 0.2°F resolution (-9.9°C to 59.9°C with 0.1°C resolution) "OFL" displayed if outside this range)
Outdoor	-22°F to 140°F with 0.2°F resolution (-29.9°C to 59.9°C with 0.1°C resolution) "OFL" displayed if outside this range
Relative humidity range	
Indoor/Outdoor	20% to 95% with 1% resolution, indoor weather station displays "--.-" if outside this range
Air pressure	
Absolute hPa/inHg	700 hPa to 1099 hPa (20.67 inHg to 32.46 inHg)
Relative hPa (adjustable)	960 hPa to 1040 hPa
Relative inHg (adjustable)	28.60 inHg to 30.45 inHg
Sensitivity setting hPa	1 hPa to 4 hPa
Air pressure history	For the past 30 hours (0, -1, -2, -3, -6, -12, -18, -24 and –30 hours)
Data checking intervals	
Indoor temperature	Every 15 second
Indoor humidity	Every 20 seconds
Outdoor temperature	Every 5 minutes
Outdoor humidity	Every 5 minutes
Sensor reading update (within sensor)	
Outdoor temperature	Every 1 minute
Outdoor humidity	Every 1 minute
Transmission frequency	433.92 MHz
Transmission range	80 feet (25m)

Power supply	
Weather Center:	3 x AA (IEC LR6) 1.5V batteries.
Thermo Hygro Sensor:	2 x AA (IEC LR6) 1.5V batteries.
Dimensions (L x W x H)	
Indoor weather station	7.75 x10.00 x 1.00 inches (196 x 254 x 25mm)
Remote thermo/hygro sensor	1.56 x 0.78 x 4.29 inches (40 x 20 x 110 mm)

WARRANTY INFORMATION

La Crosse Technology, Ltd provides a 1-year limited warranty on this product against manufacturing defects in materials and workmanship.

This limited warranty begins on the original date of purchase, is valid only on products purchased and used in North America and only to the original purchaser of this product. To receive warranty service, the purchaser must contact La Crosse Technology, Ltd for problem determination and service procedures. Warranty service can only be performed by a La Crosse Technology, Ltd authorized service center. The original dated bill of sale must be presented upon request as proof of purchase to La Crosse Technology, Ltd or La Crosse Technology, Ltd's authorized service center.

La Crosse Technology, Ltd will repair or replace this product, at our option and at no charge as stipulated herein, with new or reconditioned parts or products if found to be defective during the limited warranty period specified above. All replaced parts and products become the property of La Crosse Technology, Ltd and must be returned to La Crosse Technology, Ltd. Replacement parts and products assume the remaining original warranty, or ninety (90) days, whichever is longer. La Crosse Technology, Ltd will pay all expenses for labor and materials for all repairs covered by this warranty. If necessary repairs are not covered by this warranty, or if a product is examined which is not in need or repair, you will be charged for the repairs or examination. The owner must pay any shipping charges incurred in getting your La Crosse Technology, Ltd product to a La Crosse Technology, Ltd authorized service center. La Crosse Technology, Ltd will pay ground return shipping charges to the owner of the product to a USA address only.

Your La Crosse Technology, Ltd warranty covers all defects in material and workmanship with the following specified exceptions: (1) damage caused by accident, unreasonable use or neglect (including the lack of reasonable and necessary maintenance); (2) damage occurring during shipment (claims must be presented to the carrier); (3) damage to, or deterioration of, any accessory or decorative surface; (4) damage resulting from failure to follow instructions contained in your owner's manual; (5) damage resulting from the performance of repairs or alterations by someone other than an authorized La Crosse Technology, Ltd authorized service center; (6) units used for other than home use (7) applications and uses that this product was not intended or (8) the products inability to receive a signal due to any source of interference.. This warranty covers only actual defects within the product itself, and does not cover

the cost of installation or removal from a fixed installation, normal set-up or adjustments, claims based on misrepresentation by the seller or performance variations resulting from installation-related circumstances.

LA CROSSE TECHNOLOGY, LTD WILL NOT ASSUME LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, PUNITIVE, OR OTHER SIMILAR DAMAGES ASSOCIATED WITH THE OPERATION OR MALFUNCTION OF THIS PRODUCT. THIS PRODUCT IS NOT TO BE USED FOR MEDICAL PURPOSES OR FOR PUBLIC INFORMATION. THIS PRODUCT IS NOT A TOY. KEEP OUT OF CHILDREN'S REACH.

This warranty gives you specific legal rights. You may also have other rights specific to your State. Some States do no allow the exclusion of consequential or incidental damages therefore the above exclusion of limitation may not apply to you.

For warranty work, technical support, or information contact:

La Crosse Technology
2809 Losey Blvd. S.
La Crosse, WI 54601
Phone: 608.782.1610
Fax: 608.796.1020

e-mail:
support@lacrossetechnology.com
(warranty work)

sales@lacrossetechnology.com
(information on other products)
web:
www.lacrossetechnology.com

A. City Location Listing

The following list of city locations is entered in the database. Due the limited memory, 245 cities are listed. Every attempt has been made to provide a location close to all parts of North America. The choices were based first on state capitals, then nearby locations based on population and difference of latitude and longitude. There are cases where your city may be closer to a city in a nearby state rather than your state. We are unable to change the database, but are open to suggestions for future locations. If you feel there is a city that should be listed, please write to us (either mail or e-mail).

1. United States Cities, Listed by State

Code	State/City	Code	State/City	Code	State/City
AK	**Alaska**	**CA**	**California (cont.)**	**GA**	**Georgia**
ANC	Anchorage	SAC	Sacramento	ABY	Albany
FAI	Fairbanks	SAN	San Diego	AGS	Augusta
JNU	Juneau	SBD	San Bernardino	ATL	Atlanta
OME	Nome	SFO	San Francisco	CSG	Columbus
AL	**Alabama**	**CO**	**Colorado**	MAC	Macon
BHM	Birmingham	DEN	Denver	SAV	Savanna
GAD	Gadsden	DRO	Durango	**HI**	**Hawaii**
MGM	Montgomery	FNL	Ft. Collins	HNL	Honolulu
MOB	Mobile	GJT	Grand Junction	ITO	Hilo
AR	**Arkansas**	ITR	Burlington	OGC	Kahului
FSM	Fort Smith	PUB	Pueblo	WAI	Waimea
LIT	Little Rock	**CT**	**Connecticut**	**IA**	**Iowa**
TXK	Texarkana	HFD	Hartford	ALO	Waterloo
AZ	**Arizona**	**DC**	**District of Columbia**	DSM	Des Moines
FLG	Flagstaff	DCA	Washington	DVN	Davenport
PHX	Phoenix	**DE**	**Delaware**	SUX	Sioux City
TUS	Tucson	0N5	Dover	**ID**	**Idaho**
YUM	Yuma	**FL**	**Florida**	BOI	Boise
CA	**California**	EYW	Key West	GIB	Gibbonsville
BFL	Bakersfield	JAX	Jacksonville	PIH	Pocatello
BLH	Blythe	MIA	Miami	SZT	Sand Point
EKA	Eureka	ORL	Orlando	**IL**	**Illinois**
FAT	Fresno	PNS	Pensacola	CMI	Champaign
FTB	Ft. Bragg	TLH	Tallahassee	ORD	Chicago
LAX	Los Angeles	TPA	Tampa	SPI	Springfield
ROD	Redding				

IN	Indiana	MN	Minnesota	ND	North Dakota, cont.
EVV	Evansville	AEL	Albert Lea	GFK	Grand Forks
HUF	Terre Haute	BJI	Bemidji	**NE**	**Nebraska**
IND	Indianapolis	DLH	Duluth	GRI	Grand Island
SBN	South Bend	GPO	Grand Portage	LNK	Lincoln
KS	**Kansas**	INL	International Falls	OMA	Omaha
DDC	Dodge City	STP	St. Paul	SNY	Sidney
K32	Wichita	**MO**	**Missouri**	VTN	Valentine
KCK	Kansas City	JEF	Jefferson City	**NH**	**New Hampshire**
OH1	Wakeeney	MKC	Kansas City	CON	Concord
TOP	Topeka	MPH	Memphis	**NJ**	**New Jersey**
KY	**Kentucky**	POF	Poplar Bluff	EWR	Newark
FFT	Frankfort	SGF	Springfield	TTN	Trenton
LEX	Lexington	STL	St. Louis	**NM**	**New Mexico**
LOU	Louisville	**MS**	**Mississippi**	ABQ	Albuquerque
LA	**Louisiana**	GWO	Greenwood	MAG	Magdalene
BTR	Baton Rouge	HUV	Huntsville	ROW	Roswell
CWF	Lake Charles	JAN	Jackson	RTN	Raton
IER	Natchitoches	TUP	Tupelo	SAF	Santa Fe
NEW	New Orleans	**MT**	**Montana**	**NV**	**Nevada**
SHV	Shreveport	BIL	Billings	AIN	Austin
MA	**Massachusetts**	FTP	Ft. Peck	CXP	Carson City
BOS	Boston	GFT	Great Falls	ELY	Ely
MD	**Maryland**	HLN	Helena	LAS	Las Vegas
BWI	Baltimore	SDY	Sidney	LWL	Wells
ME	**Maine**	WTF	Whitefish	RNO	Reno
AUG	Augusta	**NC**	**North Carolina**	**NY**	**New York**
BGR	Bangor	AVL	Asheville	ALB	Albany
CAR	Caribou	CLT	Charlotte	BUF	Buffalo
PWM	Portland	FAY	Fayetteville	JFK	New York City
MI	**Michigan**	ILM	Wilmington	LKP	Lake Placid
AZO	Kalamazoo	INT	Winston-Salem	SYR	Syracuse
DET	Detroit	MCZ	Williamston	**OH**	**Ohio**
FNT	Flint	RDU	Raleigh	CLE	Cleveland
LAN	Lansing	**ND**	**North Dakota**	CMH	Columbus
PZQ	Rogers City	BIS	Bismarck	ISZ	Cincinnati
SAW	Marquette	BWB	Bowbells	TOL	Toledo
TVC	Traverse City	FAR	Fargo	YNG	Youngstown

OK	**Oklahoma**	**TX**	**Texas (cont.)**	**WV**	**West Virginia**
17K	Boise City	DFW	Dallas/Ft. Worth	CRW	Charleston
LAW	Lawton	ELP	El Paso	HLG	Wheeling
OKC	Oklahoma City	HOU	Houston	**WY**	**Wyoming**
TUL	Tulsa	LRD	Laredo	BYG	Buffalo
OR	**Oregon**	ODO	Odessa	CPR	Casper
BNO	Burns	SAT	San Antonio	CYS	Cheyenne
EUG	Eugene	**UT**	**Utah**	LAA	Little America
MFR	Medford	SAL	Saline	WYE	West Yellowstone
PDX	Portland	SGU	St. George		
SLE	Salem	SLC	Salt Lake City		
PA	**Pennsylvania**	TSN	Thompson		
CXY	Harrisburg	**VA**	**Virginia**		
PHL	Philadelphia	DON	Vienna		
PIT	Pittsburgh	LYH	Lynchburg		
SCR	Scranton	ORF	Norfolk		
PR	**Puerto Rico**	RIC	Richmond		
SJU	San Juan	ROA	Roanoke		
RI	**Rhode Island**	**VT**	**Vermont**		
PVD	Providence	BTV	Burlington		
SC	**South Carolina**	MPR	Montpelier		
CHS	Charleston	**WA**	**Washington**		
CUB	Columbia	ABE	Aberdeen		
GMU	Greenville	ALW	Walla Walla		
SD	**South Dakota**	KTF	Kettle Falls		
FSD	Sioux Falls	MVN	Mt. Vernon		
PIR	Pierre	OLM	Olympia		
RAP	Rapid City	SEA	Seattle		
TN	**Tennessee**	SFF	Spokane		
BNA	Nashville	TON	Tonasket		
CHA	Chattanooga	YKM	Yakima		
DKX	Knoxville	**WI**	**Wisconsin**		
MEM	Memphis	AUW	Wausau		
TX	**Texas**	GRB	Green Bay		
ABI	Abilene	LSE	La Crosse		
AMA	Amarillo	MSN	Madison		
AUS	Austin	MWC	Milwaukee		
BRO	Brownsville	SSQ	Spooner		

2. **Canada City Listing**

Code	City	Code	City	Code	City
EDM	Edmonton	YEL	Yellowknife	CHT	Charlotte Town
ALB	Calgary	OTT	Ottawa	MON	Montreal
VAN	Vancouver	SUD	Sudbury	QUE	Quebec
WIN	Winnipeg	THU	Thunder Bay	REG	Regina
FRE	Fredericton	TOR	Toronto	WHI	Whitehorse
HAL	Halifax				

3. **Mexico City Listings**

Code	City	Code	City	Code	City
CHH	Chihuahua	MEX	Mexico City	HER	Hermosillo
DUR	Durango	GUA	Guadalupe		